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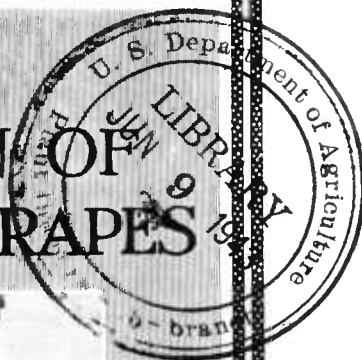
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# U. S. DEPARTMENT OF AGRICULTURE

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9/30

## HOME UTILIZATION OF MUSCADINE GRAPES



**T**HE HOME UTILIZATION of Muscadine grapes in those portions of the South Atlantic and Gulf States in which they are widely grown is much to be commended. This is one of the most common types of fruits that is to be found in the Coastal Plains sections of these States. A few vines well cared for will produce an abundance of fruit for the ordinary family. The vines are frequently grown on arbors, thereby furnishing shade as well as fruit.

Though Muscadine grapes are very plentiful, the ways in which they have ordinarily been utilized in the past have been limited, and in some seasons much fruit has been wasted. These grapes have been used mainly in the fresh state, for wine, canning, and for a few culinary purposes.

During recent years considerable attention has been given to working out new methods of using Muscadine grapes in the home, and as a result it is now possible to make a number of delicious products from them. Members of home demonstration clubs for both women and girls in the South Atlantic and Gulf States have become interested in making these products, and for several seasons past they have produced them in increasing quantities. While made only for home use in many cases, large quantities of several highly standardized products are profitably marketed each year by club members.

This bulletin is intended as a guide for those who may desire to give attention to the better utilization of Muscadine grapes. The housekeeper who is accustomed to prepare fruit products in considerable variety will readily devise other ways than those described in this bulletin.

This bulletin combines and supersedes the three publications formerly issued as Farmers' Bulletin Nos. 758, "Muscadine Grape Sirup;" 859, "Home Uses for Muscadine Grapes;" and 1033, "Muscadine Grape Paste."

# HOME UTILIZATION OF MUSCADINE GRAPES

By CHARLES DEARING, *associate horticulturist, Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry*

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## IMPORTANCE OF A BETTER UTILIZATION OF MUSCADINE GRAPES

A LARGE surplus of Muscadine grapes which may be profitably utilized at home in culinary ways is allowed to go to waste each year. Although in past years the production of these grapes assumed some commercial importance, their utilization was confined almost entirely to consumption in the fresh state and formerly to wine making. The utilization of the fresh fruit has been limited by the poor shipping qualities of the best table varieties and the lack of adequate transportation facilities. The result of this condition is a surplus supply of fruit at home. The small vineyardist sells what fruit he can locally, and the family of the farmer having an arbor of one or two vines uses such fresh fruit as the members care to eat. The remainder, with few exceptions, is allowed to fall to the ground and decay, though it could be utilized profitably in culinary ways. These uses of Muscadine grapes, however, are little known, and their value for such purposes until recently was unappreciated.

The recommendations made in this bulletin are based largely on culinary investigations conducted at the Coastal Plain station of the North Carolina Department of Agriculture at Willard, N. C., in a typical farm kitchen. As a wood-burning kitchen range or a standard kerosene stove and ordinary kitchen utensils were used, the results are such as may be expected under home conditions.

Methods of preparing sirups, jellies, unfermented juices, catsups, canned grapes, spiced grapes, conserves, preserves, marmalades, jams, and other products were tested, as well as the shipping qualities of the products.

## REQUIREMENTS FOR SUCCESSFUL WORK

By careful work, desirable food products for the home can be made economically on the farm from surplus Muscadine grapes.

Of the named varieties, the Thomas, generally speaking, makes the best grape juice and sirup of all the varieties tested and ranks

near the top in tests of other products. The Scuppernong probably ranks second as a culinary variety. Its skin is more tender than that of the Thomas, and its fragrant aroma and light color combine to make its products distinctive.

Select fruit should be used. All diseased and dirty berries should be culled out.

The ordinary kitchen utensils used in perserving other foods can be employed in preserving grapes. Enamel ware, wooden utensils, and glass containers should be used. Metal ware is subject to the corrosive action of fruit acids. A small homemade grape crusher (fig. 1) is almost indispensable. It is very efficient, though crude, and saves much time and labor. A cider press also is well adapted for crushing and pressing grapes.

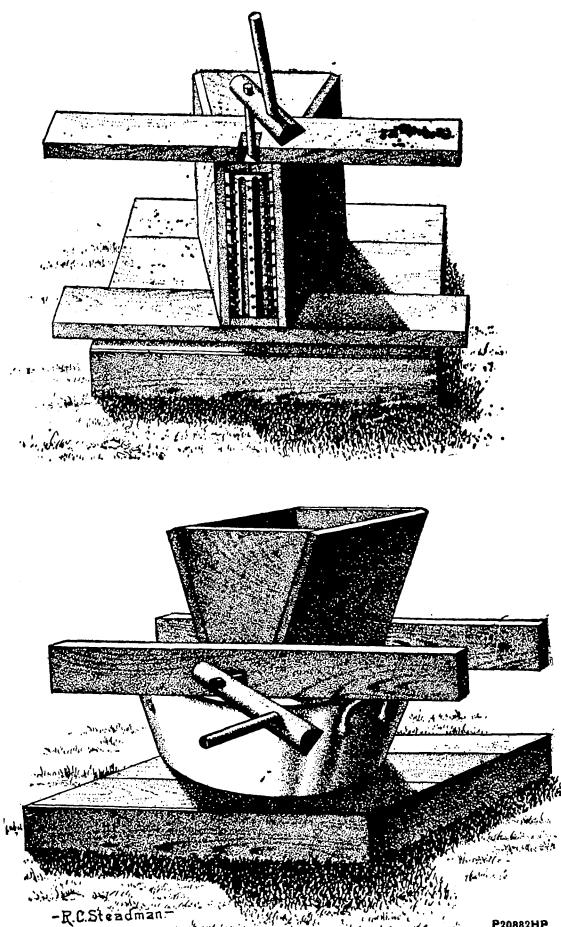


FIG. 1.—An inexpensive homemade grape crusher

Unfermented grape juices, jellies, canned grapes, sirups, and catsups probably are the most desirable home products, taking into consideration quality, expense, and the labor required in their preparation. Preserves, marmalades, and jams require larger quantities of sugar and are difficult to prepare, while the large percentage of sugar they require hardens the skins somewhat, even when the best methods of preparation are used.

## MUSCADINE GRAPE PRODUCTS

## SIRUP

Since no sugar is used in making it, the sirup is one of the cheapest of the culinary products made from Muscadine grapes. It can be utilized not only as a substitute for sorgo and other sirups but also as a sugar substitute for sweetening unfermented Muscadine grape juice and in making sirup for canning grapes.

**Varieties.**—The quality of the sirup made from different varieties of Muscadine grapes varies considerably. The varieties having the highest natural sugar content usually make the most delicious and highest quality sirup and also yield the most sirup per gallon of fresh juice. The Scuppernong, Thomas, Luola, Latham, Mish, George, and similar varieties of high quality make the best sirups. The James makes a sirup of fair quality, and the Flowers and Eden varieties make sirups which, relatively speaking, would be called acid and rough.



FIG. 2.—A homemade grape crusher and press used in the Muscadine grape-sirup experiments, showing its construction: A, Stationary part of the press; B, press blocks; C, false bottom; D, top, lower surface; E, pan to receive the juice as it flows from the press; F, pomace bag which holds the crushed grapes while they are being pressed; G, lever hinged to the building; H, weight to be attached to the outer end of the lever; I, grape crusher

**Picking.**—In picking grapes for sirup it is important to select only sound, ripe fruit. Green grapes greatly increase the acidity and reduce the quality of the finished product. Rotted or spoiled grapes impart a bitter, disagreeable taste and an unpleasant odor to the sirup.

**Directions for sirup making.**—Use well-ripened fruit of the sweetest varieties available. Extract all the juice obtainable by crushing and pressing without heating (fig. 2). Remove any sediment that may have accumulated while the grapes were being crushed and pressed by straining the juice through a double thickness of cheesecloth. For every 6 quarts of fresh, strained Muscadine grape juice stir in 2 ounces of powdered calcium carbonate (i. e., carbonate of lime, a low-priced chemical used in sirup making to remove acids). Heat the juice and allow it to boil about eight minutes. It is necessary to use a container at least one-third larger than the volume of juice, in order to prevent the vessel from overflowing when the juice foams up and breaks into a boil. Where a large vessel is not available the juice may be boiled in small quantities. Pour the hot liquid into heated tall glass containers, preferably

large-mouthed fruit jars, so as to permit its condition to be observed. Allow the liquid to settle until perfectly clear and cool. It is well to let it stand over night. After the liquid is cool and clear, showing a distinct sediment at the bottom, pour off the clear portion into a cooking vessel, being careful not to pour off any of the sediment. To this clear liquid add one-sixth of a level teaspoonful of calcium carbonate for each 6 quarts of fresh grape juice which it represents.

Complete the process of sirup making by boiling down the clear liquid, using a vessel one-third larger than the volume of the liquid. If necessary, the sirup can be completed in batches. While boiling down the liquid keep the caramel which forms on the inside of the pan wiped off with a wet cloth, so that when the nearly finished product foams up it will not carry scorched caramel into the sirup. Should any scum form during the cooking process



FIG. 3.—Kitchen equipment used in the sirup experiments. The use to which the various utensils were put is as follows: A, Homemade fireless cookers in which the jars of finished sirup were placed while hot for the purpose of making the sirup cool slowly, thus allowing the sediment and added substances to settle to the bottom of the jar; B, a stewpan for heating the sirup jars and for cooking part of the juice the first time; C, dish pans, one for catching the juice at the press and for heating the precipitating jars and the other for cooking most of the juice the first time and for cooking all the juice the second time; D, 2-quart fruit jars (precipitating jars), containers for the juice while clarifying between the first and second cookings; E, a quart cup for measuring the fresh juice, in order to determine the amount of calcium carbonate to be added; F, a dipper for stirring the juice during the first cooking; G, a strainer with cheesecloth for straining the fresh grape juice; H, funnel used while pouring the juice and sirup into jars; I, a long-handled milk skimmer for skimming the boiling sirup; J, a wet cloth for wiping the caramel formation from the inside of the pan while the sirup is boiling down; K, a bottle of calcium carbonate, the cheap chemical used in sirup making; L, a cup of water and a teaspoon for testing the sirup to determine when it is done; M, a saucer in which to weigh the calcium carbonate; and N, scales for weighing the calcium carbonate. The finished product is shown in two glass jars (O).

remove it with a long-handled milk skimmer. (Fig. 3, I.) Allow the liquid to boil rapidly until nearly done and then more slowly, to avoid scorching. Cook the liquid until it reaches about one-ninth the volume of the fresh grape juice, or until a small portion cooled in a teaspoon on the surface of cold water in a cup shows about the same consistency as maple sirup or thin sorgo sirup.

When the sirup has reached the proper thickness, pour it into heated glass fruit jars, cap the jars, and place them where they will cool very slowly. Slow cooling is very important in making the sirup clear, as it allows all sediment and added substances to settle. This slow cooling can be brought about by standing the jars of sirup in a large vessel of hot water and allowing the whole to cool or, better still, by placing the jars in a fireless cooker. One of these can be made at home by placing waste cotton, such as may be procured

from a cotton gin, in a worn-out bucket or box, leaving a place in the center for the jar of hot sirup.

When the sirup has cooled to room temperature it can be stored in a pantry or cellar until desired for use. A small quantity of harmless white sediment, known to chemists as malate and tartrate of lime, will be observed in the bottom of the jars. When desired for use simply pour the clear sirup into the table-sirup stand, leaving the sediment, which is not easily disturbed, behind. Those who prefer, however, can pour off the clear sirup into bottles or fruit jars as soon as it has cooled and then sterilize and seal just as with fruit. Sterilization consists merely in heating the jars of sirup to the boiling point. The filled jars and the caps for sealing them are placed in a pan of water, which is then brought to a boil and held at that point until the contents of the jars are approximately of the same temperature.

Comments and suggestions.—Except where glassware has been recommended it is very desirable to use only granite-ware utensils in handling the grape juice and in making the sirup, for such vessels are easily cleaned. A large granite-ware dish pan (fig. 3, C) is probably the best container to use in boiling the liquid, for it exposes a large surface to the stove and allows rapid evaporation. If preferred, however, a granite-ware wash boiler, preserving kettle, or a large stewpan may be used instead of the dish pan.

Calcium carbonate (carbonate of lime) is used in sirup making for the purpose of removing acids. In the presence of heat it combines chemically with the acids of the grape juice to form compounds which precipitate as sediments or crystallize against the sides of the precipitating jars when the liquid is placed in them to cool after the first boiling. This chemical can generally be obtained from a local drug store, and even if it is not in stock the druggist can order it from a druggists' supply house. There are many natural forms of calcium carbonate of greater or less purity; for example, shells, limestone, marble, marl, and chalk. The commercial forms recommended for use in sirup making are chemically pure calcium carbonate, commercial calcium carbonate, powdered precipitated chalk, and powdered marble dust.

There is also a commercial carbonate of lime used by painters which is known as whiting. This is very cheap, costing approximately 1 cent per pound. Whiting is, however, recommended for use in sirup making only when it can be obtained in the original package in which it was put up by the manufacturer, for in a paint store an opened package is susceptible to contamination by such harmful impurities as white lead and Paris green.

A slight excess of carbonate of lime added to the grape juice in sirup making will do no harm, but generally 2 ounces to each 6 quarts of fresh grape juice will be sufficient to remove the acids. Should the grape juice be relatively high in acid content, however, it would be advisable to add from  $2\frac{1}{4}$  to  $2\frac{1}{2}$  ounces of carbonate of lime for each 6 quarts of fresh juice before the first boiling.

When the grape juice is first heated it is well to stir it occasionally, but too much stirring seems to increase foaming. As the juice is coming to a boil a heavy foam will form on the surface, rise up, break away, and then subside. As this foam which develops previous to boiling contains free carbonate of lime it should not be skimmed off. The combining of the carbonate of lime with the grape-juice acids gives to the liquid a greenish tinge, which disappears with the precipitation of sediment after the first boiling.

In order to avoid breaking the precipitation jars and also the fruit jars when receiving the finishing sirup, it is necessary to heat them to approximately the temperature of boiling water. This can be done very easily by immersing the jars in hot water.

While it is desirable to allow the liquid to boil rapidly during the cooking process, it is not advisable to remove the lids from the stove in order to have the pan next to the fire, for in this case the heat will be concentrated too much and will scorch the sirup.

It is difficult to describe the stage in the process when the sirup has been boiled down sufficiently, but the sirup maker can easily determine this after one experience. The aim should be to remove the liquid from the stove when it has reached the consistency of a thin sirup. An experienced cook can judge this rather accurately by dropping the liquid from a spoon. The best test, though, is occasionally to take a little sirup in a teaspoon and hold this on the surface of some cold water in a cup, so as to cool it. The cooled sirup in the spoon can then be felt with the finger and its thickness judged.

For keeping Muscadine grape sirup, wide-mouthed fruit jars of pint and quart sizes will be found satisfactory.



In making Muscadine grape sirup the juice of the varieties of grapes mentioned on a foregoing page as being best adapted for sirup will need no sugar; in fact, they should not have sugar added. The sirup of acid varieties like the Flowers and Eden, however, will be improved by the addition of some sugar; say, from one-half to 1 pound for each 6 quarts of juice. The experiments show that the addition of one-half pound of ordinary cane sugar to 6 quarts of Flowers grape juice is equal to the addition of 3 extra quarts of fresh juice of the same variety, in terms of the quantity of sirup produced. The time to add the sugar is just before the second cooking. In this connection attention should be called to the Federal pure-food standards, which require that when a fruit sirup to which sugar has been added is offered for sale in interstate commerce the container must bear a label stating that fact.<sup>1</sup>

A bushel of Muscadine grapes will yield from 2½ to 4 gallons of fresh juice, depending on the variety. Most varieties, especially those best suited for sirup making, yield over 3 gallons of fresh juice.

In condensing the juice to one-ninth of its original volume to make a sirup of satisfactory consistency, 1 bushel of Muscadine grapes should yield approximately 1½ quarts of sirup.

Muscadine grape sirup is considered by many as good as or better than other sirups usually found upon the table.

As Muscadine grape sirup is usually made from home-grown fruit it can be used to supplement or even replace a direct expenditure of money for other sweets.

### UNFERMENTED GRAPE JUICE<sup>2</sup>

Where a home supply of Muscadine grapes is available no excuse exists for not utilizing it in making a sufficient supply of unfermented grape juice to meet the family's needs for a year. Unfermented juice is the least expensive product that can be made from grapes, and it is a delightful, refreshing drink for summer use. Muscadine grape juices are successfully preserved by two methods. These are designated as the cold-press method and the hot-press method, because the only essential difference in the two processes is that in one case the juice is obtained by pressing the fresh fruit without heating it, while in the other the fruit is heated and the juice expressed from the hot fruit. The cold-press method is the simplest and quickest and yields brilliant, transparent juices which are not only generally superior in flavor and aroma but also much more pleasing in appearance. The hot-press method yields a greater quantity of juice, but requires the additional labor of heating the fruit before pressing. Again, the hot-press juices resemble more nearly the commercial Concord grape juice, because the heating draws the coloring matter from the skins. Some of these dark juices have a very attractive color, but the flavor which the skins impart to the juice while heating rarely improves the quality of the product. Some of the hot-pressed juices, moreover, are viscid in appearance, whereas by the cold-press method the same variety of grape makes a brilliant, transparent, attractive, and more uniform product. Generally, therefore, the cold-press method is best for home use.

The following directions for making unfermented Muscadine grape juice are based on experiments made by the United States Department of Agriculture in 1916 and followed successfully each year since then in the department's work:

**Cold-press method.**—Select sound, clean, fully ripe fruit; crush the fruit by hand or, better, with a homemade crusher, such as the one shown in Figure 1. If a cider mill is available it is well adapted for both crushing and pressing.

<sup>1</sup> Standards of purity for food products. U. S. Dept. Agr., Off. Sec. Circ. 19, 19 pp., 1906. Out of print; may be consulted in libraries.

<sup>2</sup> Charles Dearing. Unfermented grape juice: How to make it in the home. U. S. Dept. Agr., Farmers' Bul. 1075, 31 pp., illus. 1921.

After the berries are crushed the juice should be pressed from the fruit immediately. Small quantities of fruit can be pressed in a clean cloth sack by hand, but if as much as a bushel of grapes is being handled a cider mill or an inexpensive homemade press like that illustrated in Figure 2 should be used. Having obtained the fresh grape juice, strain it through flannel and then place it in bottles or fruit jars. Either fruit jars of the clamp-top or lightning-seal types, or bottles with crown caps are very satisfactory containers for grape juice for home use. Having placed the juice in bottles or jars, put these in a water bath and sterilize by heating until the juice has reached a temperature near but not quite up to the boiling point. If a thermometer is available, the temperature can be tested. As soon as the juice has reached a temperature of 190° to 200° F. (95° to 98° C.) remove it from the sterilizer.<sup>3</sup> If no thermometer is available, remove the juice as soon as it shows the first sign of simmering preliminary to boiling. A good home water bath or sterilizer can be provided by placing a false bottom of wire gauze (4 meshes to the square inch) or a thin board in which numerous holes have been bored, in the bottom of a wash boiler or large, covered preserving pot filled with water enough to surround but not cover the bottles or jars of grape juice. (See fig. 4.) The false bottom enables water to get under the juice containers, and the cover of the water bath confines the steam, which sterilizes the upper parts of the containers. Just as soon as the temperature of the juice has reached the point at which sterilization has been assured, remove the bottles containing the juice from the water bath, seal at once, and store in a dark, cool place until desired for use. In using the fruit jars the lids and rubbers are laid loosely on them while in the hot-water bath, so that they

also will be sterilized. If bottles are used cork them with new corks that have just been soaked for about 30 minutes in water at a temperature of not less than 140° F. Use a cork a little wider than the mouth of the bottle, and after inserting this as far as possible cut off the rest of the cork even with the mouth. Dry the mouth of the bottle thoroughly and dip in a melted mixture of equal parts of beeswax and rosin or in melted paraffin.

**Hot-press method.**—The hot-press method is identical with the cold-press method, except that the crushed fruit is heated nearly but not quite to the boiling point and is then pressed while hot. In home work the fruit generally is heated in a large dish pan. Stir it while heating, so as to bring the entire mass simultaneously to the desired temperature. Then place it in a cheese-cloth bag, hung over a receptacle to catch the juice, and press by hand. Allow the juice to cool, strain it, and then proceed as in the cold-press method.

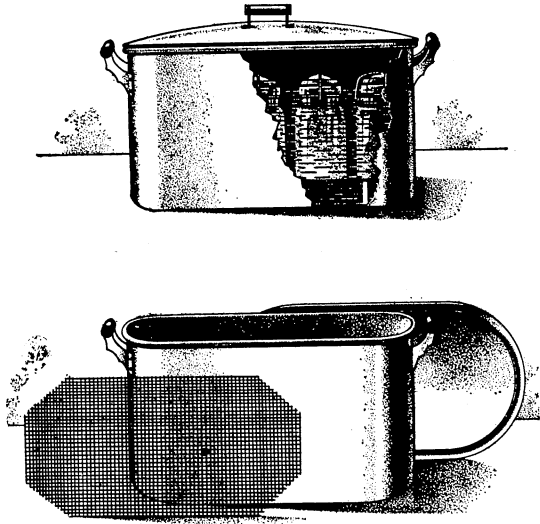


FIG. 4.—An outfit for the home sterilization of unfermented grape juice and other products

<sup>3</sup> It is simpler and quite proper to seal up the juice tightly in bottles or jars, leaving some air space in the container to allow for the expansion of the juices by heating. In this case the containers are submerged and the temperature of the water is taken. The containers, if quart jars, should be left in the water for at least 15 minutes after the water reaches 190° F., but gallon jugs require 30 minutes, while one-fourth-pint bottles take only 5 minutes. The time required for containers of other sizes should be varied accordingly.

The variety of Muscadine grapes used in making unfermented grape juice has great bearing on the quality of the final product. Of all the varieties tried, the Thomas undoubtedly makes the best grape juice. The juice of this variety has the best flavor, the greatest brilliancy and transparency, and the most pleasing and abundant aroma. The Scuppernong variety ranks second for unfermented juice, and the Latham, Mish, Luola, George, Memory, James, and Eden rank above the average.

In the preparation of home products economy may be secondary to quality. This being the case, it is important to mention here that the first or free-run juice obtained in pressing makes the best unfermented grape juice. This is the juice between the skin and the pulp of the berry. It is sweeter, more highly flavored, and more brilliant than the juice from the seed chamber inside the pulp. In home work it is recommended that the juice obtained by a very light, cold pressing be used for unfermented juice making and the residue of hulls, pulp, and pulp juice for jelly making. The unfermented juices of certain varieties that are lacking in body and sweetness can be improved in these respects by stirring into them a small quantity of sugar or Muscadine grape sirup when the juice is opened for use. The exact amount of sirup to add must be determined in each case by tasting.

Unfermented Muscadine grape juice is so very refreshing on hot summer days, so easy to put up, and so inexpensive that every southern home should have a bountiful supply.

#### JELLY

When proper methods are pursued, Muscadine grapes will yield as fine jelly as can be obtained from other fruits. Certain difficulties, however, are to be overcome, the chief of which are (1) obtaining enough pectin content to give sufficient body to the finished product and (2) avoiding the formation of argol crystals in the jelly.

#### MEANS OF OBTAINING SUFFICIENT PECTIN

Pectin is the name given to a gelatinous substance occurring in fruits and elsewhere which enables one to make jelly. Pectin occurs in sufficient abundance in such fruits as the apple and currant to make a firm jelly and is very abundant in the white peel of citrus fruits. In some fruits it is lacking almost entirely, so that these fruits are not used for jelly making. In Muscadine grapes it is present, but in quantity generally insufficient for making firm jelly unless methods are followed which augment or concentrate the pectin.

The investigations of the Department of Agriculture show that certain factors bear upon pectin content.

(1) Probably the first consideration is to use fruit at the right stage of maturity. Full-grown green grapes seem to develop the most pectin in jelly making, and the pectin content decreases with the ripening of the fruit. Since flavor and tendency toward crystallization must be considered as well as pectin, the aim should be to use fruit as ripe as possible and yet not so ripe that the pectin will be insufficient to give to the jelly the desired body and texture. For home use riper fruit can be used than in commercial jelly making, but it is well even in home jelly making to have as much body or firmness as possible without sacrificing flavor or texture. All things considered, it probably is best to use fruit in the "rare-ripe" stage for jelly making or to use equal parts of green and ripe fruit.

(2) The pectin content varies considerably with the variety, and it behaves differently in the different varieties as they ripen. Some Muscadine grapes, even when rather green, have very little pectin, whereas others, such as the Scuppernong, not only have abundant pectin when green, but even when ripe have sufficient pectin to make a fair grade of home jelly. Other varieties, for example, the James, have abundant pectin content for home jelly making up to the "rare-ripe" stage, but when fully ripe have lost so much pectin that it must be supplied if jelly is to be made. The Thomas does not have so much pectin as the Scuppernong, but as it ripens it maintains its pectin better than the James variety. The Flowers resembles the Scuppernong in pectin content, and the Mish is similar to the James, whereas the Eden has slightly more pectin than the Thomas.

(3) Having obtained fruit at the proper stage of ripeness of a variety known to contain a relatively large amount of pectin, the next means of insuring a firm jelly is to cook the fruit thoroughly before extracting the juice for jelly making. The cold-pressed juice of Muscadine grapes contains practically no pectin, but by heating the fruit before extracting the juice pectin apparently is liberated into the juice from the solid parts of the berry. Thorough cooking insures the liberation of all the pectin, but, on the other hand, if the cooking is continued too long the volume of juice will be lost through evaporation. Cooking the fruit for approximately 10 minutes after the juice first boils is about right.

(4) Having obtained by cooking and juice extraction a jelly stock containing pectin, the proportion of pectin can be increased by boiling down the jelly stock to decrease its volume or by adding less than the normal quantity of sugar, so that in making the jelly a greater evaporation will take place before the jelling point is reached. It should be remembered, however, that the greater the concentration or the longer the cooking, the darker and less brilliant is the finished product. Moreover, in concentrating pectin by the evaporation of jelly stock, the acid and the sugar content of the jelly stock also are concentrated. It is therefore especially necessary in this case to take precautions to avoid crystallization, and since the fruit sugar is concentrated less commercial sugar need be added. In the experiments of the Department of Agriculture the use of a half measure of sugar to a full measure of Scuppernong jelly stock from "rare-ripe" grapes, or, better, concentrating the normal jelly stock about one-half and then using sugar, measure for measure, gave a very firm jelly.

(5) The final resort in increasing pectin is the introduction of pectin into the jelly from an outside source. The best means of doing this is by using an orange pectin solution, since this is high in pectin and almost free from acidity, color, and flavor.<sup>4</sup> Commercial brands can be purchased locally.

Since apple-jelly stock contains abundant pectin, it is a convenient substitute for the orange pectin solution. In using it, however, a certain amount of color and flavor will be introduced, and it is less effective than the orange pectin solution in preventing crystal formation. Apple stock made from mild-flavored green or yellow ripe apples is best.

When a pectin solution is added to increase the pectin content, the quantity of sugar used should be based on the quantity of grape-jelly stock, regardless of the quantity of pectin solution added, for the aim is not to make a pectin-solution jelly, but to add pectin to the grape-jelly stock. The use of pectin solutions in making Muscadine grape jelly is entirely practicable and advisable, though not necessary to

<sup>4</sup> The following recipe adapted from Extension Bulletin No. 6, Florida State College for Women, Tallahassee, Fla., outlines a quick method of preparing the orange pectin solution: Cut or scrape the yellow from the peel of oranges. Pass the remaining white portion through a food chopper; then weigh it. For each quarter pound of peel add half a pint of water and 2 tablespoonfuls of lemon juice. Mix thoroughly and allow the mixture to stand one hour. Add 1½ pints of water. Let stand 1 hour; boil 10 minutes; let stand until cold. Place in a flannel jelly bag, press to remove the juice, and drain the juice through a clean flannel jelly bag.

This produces a jelly stock from which clear jelly can be made. It can be prepared in quantity and canned for future use. By double running the white peel of 3 dozen oranges the writer has obtained on two occasions 24 pints of pectin solution. Rough-skinned, light-weight oranges have the most white peel.

make jellies of sufficient firmness for home use. Through the use of small quantities of pectin solution not only can firm jellies be made but crystallization is avoided, and higher colors and flavors can be obtained, since riper grapes may be used. If the product is sold, the fact that pectin has been added must be indicated on the label to comply with pure food regulations.

#### PREVENTING CRYSTAL FORMATION

In making grape jelly and when grape juice is heated, the excess acid tends to crystallize, forming potassium acid tartrate, a substance which in wineries, unfermented grape-juice factories, and other grade-product establishments is known as argol. In large establishments this argol is saved and later refined in by-product establishments and sold as cream of tartar and tartaric acid. The formation of argol crystals in jelly should be avoided. These crystals are readily formed in Muscadine grape jellies, owing to the high acid content of this fruit, but with proper precaution crystallization may be avoided. There are several more or less effective means of avoiding the formation of crystal in the jelly, some of which are more important than others.

(1) Grapes ripen in the fall when the nights are cool. It is therefore possible to make the jelly stock<sup>5</sup> in the afternoon and allow it to stand over night in shallow pans without any fermentation. When so treated the jelly stock cools rapidly and crystals form readily against the pan and over the surface of the liquid. The jelly stock is then run through a flannel bag to remove the crystals, and the process of jelly making is continued. By this method crystal formation is greatly reduced, but not entirely prevented. The jelly stock should be allowed to stand until thoroughly cool, but it is very important not to let it stand until fermentation begins.

(2) Another method of removing crystals is to seal the hot jelly stock in glass fruit jars and then to strain and make jelly from it during the winter, at a season when there is more time for special culinary work, after the crystals have formed in the jars. This method has proved valuable, though not infallible, as a means of avoiding crystallization in the jelly. The canning of the jelly juices in glass fruit jars and then making jelly in small quantities as needed avoids crystals and also provides fresh jelly, which is better than old jelly.

(3) Other factors to be considered in avoiding crystallization are as follows: (1) The greener the fruit used, the greater the tendency to crystallization; (2) the higher the acid content in relation to the sugar content of the grape variety used, the greater the tendency to crystallization; and (3) the smaller the proportion of sugar added to a jelly stock, the greater the tendency to crystallization. In regard to these factors, however, a medium ground may be best, since desirable pectin content and a tendency to crystallization are, generally speaking, influenced in opposite directions.

(4) The best means of avoiding crystal formation, a means which at the same time increases the pectin content and permits the making of jelly from fresh jelly stock, is the addition of a small quantity of orange pectin solution, apple jelly stock, or other fruit-pectin solution. In the experiments of the Department of Agriculture the addition of 1 cup (one-half pint) of orange pectin solution and three-fourths of a quart of sugar to a quart of ripe jelly stock was sufficient to prevent crystal formation.

#### QUALITIES OF VARIETIES

Muscadine varieties differ in the flavor, aroma, and color which they impart to their jellies. Of the named commercial varieties, the

<sup>5</sup> Jelly stock is the term used to designate the juice obtained after cooking the fruit and placing it in a drip or drain bag. Jelly stock differs from hot-pressed unfermented juice in that it has been heated beyond the boiling point.

Thomas yields the sweetest, mildest jelly, one suited for dessert uses or with bread and butter in school lunches, whereas the Eden and most varieties of *Vitis munsoniana* yield tart jellies, well suited to serving with meats and game. The Thomas jellies have a fragrant aroma and a bright-red color. The Eden and the Munsoniana jellies are somewhat lacking in aroma and very dark in color, but not unattractive. The Scuppernong ranks highest of all varieties from the standpoint of making a jelly which is at once good, attractive, and distinctive. Scuppernong jelly is very fragrant in aroma, a beautiful golden brown in color, and has a delicate flavor. Its flavor is intermediate between the sweet and the tart jellies, so that it is suitable for all occasions. Luola jelly has as fine color and flavor as that of any variety tried, but it is less distinctive. It has somewhat the flavor of Concord grape jelly and is mild and sweet like Thomas jelly. The Flowers makes a jelly inferior in aroma, color, and flavor to jellies of the other varieties mentioned, and the James, Memory, and Mish rank intermediate between Flowers and the best varieties.

The possibilities in blending varieties should be considered. For example, a blend of "rare-ripe" Luola with ripe Thomas (a possibility, owing to their time of ripening) probably would result in a better combination of color, aroma, flavor, and texture than from the use of either separately. By canning the jelly stocks of different varieties, these may be blended with each other and with other fruit-jelly stocks in any desired combination.

#### DIRECTIONS FOR HOME JELLY MAKING

The investigations of the Department of Agriculture indicate that the best results in home jelly making will be obtained from the following procedure:

Select fruit of a desirable variety and in the proper stage of ripeness, as explained. Use only clean, dry, sound fruit. Avoid fruit picked within 24 hours after rain, and if possible work during clear weather. Stem the grapes by hand and then crush a sufficient number of the berries to provide enough juice in the bottom of the cooking vessel to prevent scorching when the fruit is cooked. The rest of the berries can be crushed more easily after they are hot, using a wooden potato masher. A better plan for crushing, and one strongly recommended, is to crush all the berries before cooking by running them through a homemade crusher, such as the one illustrated in Figure 1. Then cook the crushed berries in a large preserving kettle or a dish pan of a type unaffected by fruit acid, stirring with a long-handled spoon. After they have boiled about 10 minutes, or when the berries are broken down so that the mass stirs freely, pour the cooked grapes into a double cheesecloth bag, or its equivalent, and hang up to drain without pressing (fig. 5). The juice (called stock) obtained in this way can either be canned for use in winter jelly making after crystal formation or used immediately. In either case the process is the same. In making jelly at once, if the nights are cool, so that there is no danger of fermentation, procure the jelly stock in the late afternoon and allow to cool over night in shallow pans, in order to encourage crystal formation. After immediate cooling, after standing over night, or after canning, as the case may be, clarify the jelly stock by running it through flannel or felt at least once. For this purpose a flannel or felt jelly bag (fig. 5) is most convenient. Then test the clarified jelly stock, if possible, for sugar, acid, and pectin, in order that the character of the particular sample may be known and proper measures taken for making the best possible jelly.<sup>6</sup>

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<sup>6</sup> For tests of jelly stock and comments, see next section.

Generally, the tests will show the jelly stock to be such that the following procedure will be approximately correct:

Measure the jelly stock and place it in a cooking vessel of such size and shape that the liquid will be shallow and spread out rather than deep and confined. For each quart of the jelly stock used add 1 cup (one-half pint) of orange pectin solution to avoid crystallization and to increase the pectin content, and then add a level quart measure of cane sugar. Stir to partially dis-

solve the sugar. Place on the stove and boil steadily without stirring until the liquid jells.<sup>7</sup> Remove from the fire, skim at once, and pour into sterilized jelly glasses; skim again in the glasses if necessary; immediately cover with at least one-eighth inch of hot melted paraffin. When the paraffin has cooled, cap, label, and store the glasses and contents in a cool, dry, dark place.

#### COMMENTS AND SUGGESTIONS ON THE JELLY-MAKING PROCESS

The following comments and suggestions will aid in the making of Muscadine grape jelly and will supplement and explain the concise directions given in the preceding section:

**The acid test.**—In making jelly in the home the worker generally will have to rely on the sense of taste as a means of determining the acidity of Muscadine grape jelly stocks, for the test and equipment needed are too complicated for practical home use. If the jelly stock tastes unusually acid for the variety, being made of grapes of the Flowers or some other acid variety, or if relatively green grapes have been used to furnish the jelly stock, it is advisable to add a small quantity of apple jelly stock, or, much better, orange pectin solution. This will tend to prevent the formation of crystals of excess acid in the jelly. A cup (one-half pint) of orange pectin solution or apple jelly stock to each quart of Muscadine grape jelly stock should be sufficient to prevent crystal formation in the jelly. Unless it is necessary to increase the pectin content of the grape jelly stock, the added apple jelly stock or orange pectin solution can be considered as so much grape jelly stock in adding sugar.

**The sugar test.**—The proper quantity of sugar to add to the jelly stock depends on the proportion of grape sugar already in the fruit and on the abundance of pectin present. The old home rule for adding sugar to jelly stock in jelly making is, "Use measure for measure." This, however, is not always right for making Muscadine grape jelly, in view of the fact that this stock is generally sweeter than other jelly stocks, such, for example, as currant and crab

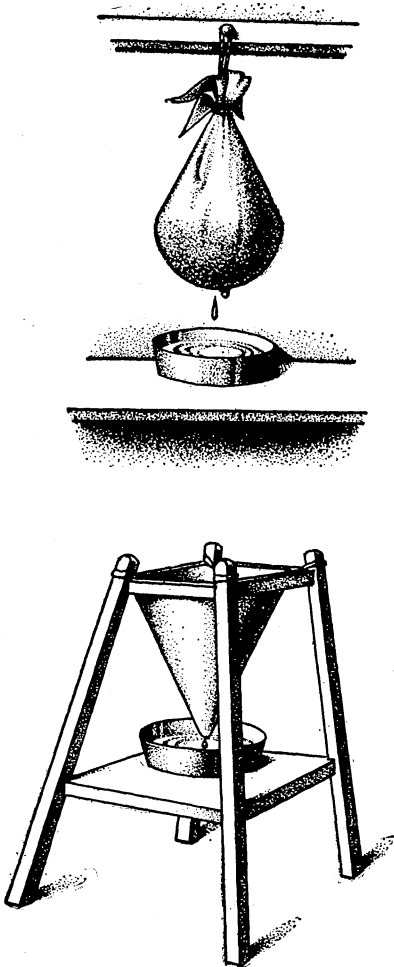


FIG. 5.—A drip or drain bag for use in jelly making (above) and a jelly bag with rack (below)

<sup>7</sup> See description of test to determine the jelling point in the following section.

apple. The proportion of sugar in the jelly stock can be determined rather accurately by the use of a saccharimeter (fig. 6), which need not cost more than 75 cents. As the saccharimeter is a valuable instrument for use in many other culinary operations as well as jelly making, it might be considered a necessary piece of kitchen equipment. Those saccharimeters are best which when corrected to standard temperature show the actual percentage of solids in solution. Nearly all the solids in solution in grape juice and jelly stock are sugars. If the saccharimeter test gives a reading of 12 per cent or less, it is safe to use measure for measure, but if the test reads around 17 per cent, as it often does, the proportion of sugar should be reduced to three-quarters of the measure to each measure of jelly stock. If the jelly stock has been shown to be deficient in pectin content by test, the quantity of sugar may be still further decreased in order to allow for concentration. In reducing the sugar, however, it should be remembered that such reduction increases the tendency toward crystallization. It is a better plan to increase the pectin content by the addition of orange pectin solution rather than by the reduction of sugar.

**The pectin test.**—The pectin content of a jelly stock can be judged roughly by noting the extent to which the stock tends to flake (i. e., pour in a sheet rather than in separate streams or in one round stream) when poured from a smooth surface, such as the edge of a shallow porcelain pan. The pectin test recommended by Dr. M. N. Straughn and others<sup>8</sup> is easily made by placing a teaspoonful of the jelly stock in a teacup and adding to it a teaspoonful of 95 per cent grain or denatured alcohol. This causes any pectin present to gelatinize. If much pectin is present, it forms in one large mass; if little pectin is present, it forms as individual flakes in the liquid. By making this test it is possible to judge the proportion of sugar to jelly stock to use, and also whether it is necessary to introduce pectin into the stock in order to make jelly of the desired body or texture. "Rare-ripe" Scuppernong grapes generally test sufficiently high in pectin to indicate that a jelly of sufficient body to hold its form when turned out of the glass can be made. This is the ideal texture for home jelly.

**Jelly stock from pulp only.**—Normally, Muscadine grape jelly is made by cooking the whole fruit, since much pectin can be developed from the skins. Jellies of lighter color and milder flavor, however, can be made by discarding the hulls and making the jelly stock by boiling only the pulps and juice together to develop the necessary pectin in the jelly stock.

**Time to add sugar.**—In making jelly from Muscadine grapes in the home it is recommended that the sugar be added to the jelly stock before beginning the process of boiling down to the jelly point. If, however, the aim is to make the most brilliant and attractive jelly possible, it is advisable to withhold the adding of sugar until the jelly stock has boiled down or evaporated to approximately half its volume. In this case, the sugar should be heated in the oven while the jelly stock is boiling down and added hot, so as not to cool the boiling liquid. This late addition of sugar reduces the time during which the jelly cooks at a high temperature, since the more sugar a liquid contains

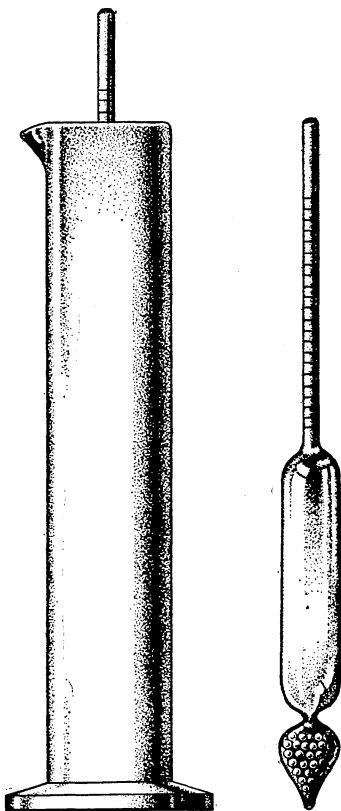


FIG. 6.—An outfit for testing the saccharine content of fruit juices

<sup>8</sup>A. E. Harris. Jellies, preserves, and marmalades. Receipts and directions. Fla. State Coll. Women Extens. Bul. 6, 28 pp., illus. 1916.



the higher the temperature required to make it boil, and boiling may proceed at a relatively low temperature up to the time of adding the sugar.

**Skimming.**—Normally, in making jelly in the home it is well to remove any scum forming on the surface of the boiling jelly as soon as it forms in a definite mass, but skimming is not absolutely necessary until the finished jelly has been poured into the glasses. If a heavy scum forms, it is best to remove it before the jelly foams up in boiling; again, when the boiling is completed but before pouring into the jelly glasses; and then a third time after it is in the glasses. Normally, however, it will be found entirely satisfactory to omit either the first or the second skimming mentioned.

**The jelly test.**—In making jelly for home use the aim should be to end the boiling-down process as soon as enough water has been evaporated to give a jelly of sufficient body to hold its form when it is turned out of the glass, but to avoid cooking it until it is tough and gummy.

The exact stage at which the jelly should be poured is called the jelling point. This depends greatly upon the pectin content of the particular lot of jelly. The more pectin present the sooner the jelly can be safely removed from the fire and the higher the quality of the jelly. Normally, it should be removed from the heat very shortly after it has attained a temperature of 218° F. If one is making several runs of jelly from the same lot of jelly stock the proper temperature for removing the jelly from the fire can be determined and uniform results obtained by cooking all lots to this temperature. If, however, different jelly stocks are being used, the exact temperature of the jelling point will vary more or less, owing to the variable pectin content. For this reason in making jelly in the home the thermometer serves only as a guide, and the ordinary flake or sheet test should be relied upon chiefly. This test is made by taking a little of the boiling liquid on a stirring paddle or spoon, rotating it a moment to partially cool it, and then pouring it back into the cooking vessel, noting the way in which it leaves the paddle or spoon. If it flakes or sheets—that is, pours in a sheet rather than as a thin sirup—it is safe to remove the jelly from the heat. If in pouring over the edge of a spoon the jelly flakes or sheets, a little jelly often adheres to the spoon, hanging as a jellylike string or rope of one-half to 1½ inches in length. After making one or two runs of jelly, the worker will have little difficulty in determining the jelling point fairly accurately by the flaking or sheeting test. The time required to boil down the jelly stock and sugar mixture to a jelly varies greatly with the volume of jelly being made, the shape of the cooking container, and the intensity of heat applied.

**Weeping.**—The Muscadine jellies, like other jellies, tend to “weep”; that is, they tend to absorb moisture and by capillary action climb up the side of the container and overflow in tearlike streams. No means of avoiding this is known at present; but, normally, weeping will be avoided if the worker does not fill the glasses to the brim, is careful not to tilt or jar the jelly in the glasses, and stores the product in a dry place. There are commercial devices for sealing jelly tumblers tight enough to prevent weeping.

#### CANNED GRAPES

Canning is a very economical way of utilizing Muscadine grapes, since little sugar is required for this process. The canned grapes are suitable for serving on the home table in sauce dishes as a breakfast appetizer, a side dish, or a dessert. They can be used also in pies, puddings, cakes, etc.

In the investigations of the Department of Agriculture the Muscadine grapes were canned successfully by three methods, designated as the cooking method, the sugar-sirup method, and the grape-sirup method. The first is the easiest and most practicable, whereas the two others have the advantage of yielding more attractive products, because the berries do not lose their shape. Whatever the method, the essential features are (1) getting rid of the seeds, (2) softening the skins, (3) sweetening with a small addition of sugar, and (4) careful sterilization and sealing in fruit jars.

**Cooking method.**—In canning grapes by the cooking method, which is the one generally recommended for home use, use firm but fully ripe fruit. After weighing the berries, separate the skins and pulps after running the fruit through a crusher like that shown in Figure 1. If preferred, the berries may be pulped by hand. Then place the hulls in a closed vessel, adding one-half pint of water for each 6 pounds of fresh fruit. Cook until the hulls are quite tender. When this point is reached, the added water will have mostly evaporated unless the vessel has been very tightly closed. While softening the hulls, heat the pulps and juice in another vessel until the pulps break down enough to liberate the seeds. Then put the pulp through a colander to get rid of the seeds. Put the seedless pulps and softened hulls together when cool and add sugar and water at the rate of 1 pound of sugar and one-quarter pint of water to each 6 pounds of fresh fruit. Then bring the mixture slowly to a boil, and after boiling for 8 to 10 minutes pack and seal it while hot in hot sterilized fruit jars.

**Sugar-sirup method.**—In canning the whole berries by the sugar-sirup method use firm, ripe fruit. Slit all the berries on the side horizontally with a small-bladed knife, and then brush the seeds from them with the point of the knife. Pack the seeded whole berries, cold, in pint jars and pour over the fruit until the jars are filled a sugar sirup made by boiling equal measures of sugar and water together for 1 minute. After allowing to stand for 30 minutes to permit the sirup to seep through the slit in the berries, refill the jars with sirup, and put the rubbers and caps in place with the jar clamp in a raised position. Then steam the jars in a home steamer until the skins have softened and the fruit and jars are sterilized. While the jars are still hot refill with boiling sugar sirup and then seal by clamping down the lid. The proper length of time to steam the fruit and jars varies with the variety. The Scuppernong requires approximately an hour; the James should steam  $1\frac{1}{2}$  hours; and the Thomas will require fully 2 hours. The aim should be to steam the fruit long enough to soften the skins without having the berries break down. Unless the seeds are removed so that the sugar sirup gets inside as well as outside, the berries shrivel up when canned by this process.

**Grape-sirup method.**—The grape-sirup method is identical with the sugar-sirup method, except that a concentrated grape juice, made by boiling the unfermented fresh juice down to two-thirds its original volume, is used. The quality of the finished product obtained by this method is hardly equal to the product canned in sugar sirup, but the method avoids the necessity of using sugar and therefore is economical.

For canning purposes the Thomas and the Scuppernong varieties are best.

#### SPICED GRAPES

Spiced Muscadine grapes are much the same as canned grapes prepared by the cooking method, except for the spices. The product is slightly more expensive and more difficult to make, but a small quantity of it will be desirable for the sake of variety, and many people greatly prefer the spicy products to those having pure fruit flavors.

The method used for making spiced grapes is essentially like the cooking method of canning the grapes.

After combining the softened hulls and seeded pulps, for every 5 pounds of fresh fruit used add the following:

$2\frac{1}{2}$ pounds of sugar.	$1\frac{1}{2}$ ounces of ground cloves.
2 ounces of ground cinnamon.	$\frac{1}{2}$ pint of vinegar.

Then boil the mixture over a slow fire until a little thick. If 5 pounds of fruit are used this will require about an hour's boiling.

Since the flavor of the spices predominates, the variety factor is of less importance than in other products. Some people prefer a special product made as above, but with the vinegar, the cloves, and half the sugar omitted. Again, just the grape skins may be spiced, leaving the pulp and juice for marmalade making.

**CATSUP**

Muscadine grape catsup is a pleasing sauce to serve with cold meats. It is a cheap product, easily made, and keeps well even in an open container. Moreover, it holds an important place in Muscadine grape utilization, because it can be made from varieties which, owing to their acidity, are not well adapted for use in other ways. In making catsup the juicy varieties are best, and an acid juicy variety is to be preferred to a very sweet one. \*

To make Muscadine grape catsup, first weigh and then crush the fruit. Stew the crushed fruit over a slow fire until soft, and then work it through a colander with a spoon, leaving the skins and seeds behind. To the juicy portion which passes through the colander add for each 5 pounds of fresh fruit used—

2½ pounds of sugar.	½ tablespoonful of pepper.
1 tablespoonful of ground cinnamon.	½ tablespoonful of salt.
1 tablespoonful of ground allspice.	1 pint of vinegar.
1 tablespoonful of ground cloves.	

Boil the mixture until slightly thick and then seal it hot in hot sterilized bottles or fruit jars.

**CONSERVES**

Muscadine grape conserves are delicious products, well adapted for use in making sandwiches for school lunches. They also make a good dessert and may be used as a substitute for preserves, jam, etc. They are slightly more expensive than some of the products already described, but if orange pectin solution has been prepared in connection with jelly making, the making of these conserves will utilize the oranges from which the peel was taken for the pectin solution. The fact that they contain raisins, oranges, and nuts in addition to grapes makes them a very wholesome combination. One recipe for making conserves is as follows:

3 pounds of grapes.	2 large oranges.
1 pound of sugar.	½ pound of finely ground pecans.
½ pound of finely ground raisins.	

Take sound, ripe grapes. Weigh and pulp them. Treat the pulps as in canning, in order to remove the seeds. Grind the hulls fine in a meat grinder or chop them fine, and then soften them as in canning. Place the hulls and pulps together and add for every 3 pounds of fresh fruit 1 scant pound of sugar, half a pound of finely ground raisins, the meaty part of two large oranges, and one-fifth of the ground peel of one orange. Cook this mixture approximately an hour over an even, slow fire until it is real thick. Then stir into the mixture one-half pound of ground pecan-nut meats. After again allowing it to boil for about 5 minutes remove it from the fire, pack solidly in small containers, such as 4-ounce jars or jelly glasses, and cover with paraffin. If the product is packed in jars, these can be processed for 15 minutes, in order to sterilize the contents.

Since the conserves are a mixture of several products, the particular variety of grape used is of less importance than in some other products. However, those varieties having relatively thick skins which soften readily are the best for this purpose. Delicious conserves have been made from the Scuppernong, Thomas, and James varieties.

**PRESERVES**

Muscadine grapes can be used for making preserves, but they are not as valuable in this form as in products requiring less sugar.

The large quantity of sugar used in preserving causes the skins of the grapes to harden more or less, even though they have been thoroughly softened during the process of preparing the preserves.

The method which was found best for preserving the grapes is as follows:

Take "rare-ripe" fruit. Weigh it and slit the berries on the side or cut in two with a sharp knife and extract the seeds with the point of the knife. To every 2 pounds of grapes add a half pint of water and cook the fruit in a closed preserving kettle until the skins are tender. When this point is reached add  $1\frac{1}{2}$  pounds of sugar for every 2 pounds of fresh grapes after it has been brought to approximately the same temperature as the fruit by heating in the oven. Then allow the mixture to boil slowly for approximately five minutes, after which lift the berries from the sirup with a long-handled, perforated milk skimmer, and place in shallow dishes. Boil the sirup about five minutes longer in order to thicken it to near but not quite the point of concentration at which it should jell. Then remove it from the fire and pour over the berries. Allow the berries and sirup to stand over night. The next morning pack the mixture, while cold, into fruit jars. Process these by heating in a home steamer for a sufficient time to sterilize the jars and their contents thoroughly, after which clamp the jars tight and label them. Pint jars require processing for about 20 minutes and quart jars require about 30 minutes.

Generally speaking, the varieties which are suitable for canning purposes are the ones best adapted to preserving.

#### JAM

Muscadine grape jam is a very good product if properly made, but there is danger of too much or too rapid cooking, of the use of too much sugar, and of not getting the skins properly softened in so sweet a product.

Up to the point of adding sugar, jam is prepared in the same manner as canned grapes. Then to the combined hulls, pulp, and juice—the skins having been softened and the seeds removed from the pulp—1 pound of sugar is added for each 2 pounds of fresh fruit. The mixture is cooked very slowly, with frequent stirring, until thick, then packed and sealed hot in sterilized jars.

If sweet varieties of grapes are used, less sugar is needed, while if the varieties are acid, the proportion of sugar had better be increased. The Flowers grape, a very coarse variety, makes a good jam by using 3 pounds of sugar to 5 pounds of fruit. Although not so well adapted for use in other ways, this is one of the best varieties for jam making, because its skin is meaty and readily softened. The relative softening qualities of grape skins may be determined by biting the skin and noting the ease with which it parts under the pressure of the teeth. Such varieties as the Thomas and James offer more resistance to the teeth than varieties like the Flowers and Scuppernong.

#### MARMALADE

Of the heavily sugared Muscadine grape products, the marmalade is most desirable.

To make this product, pulp the ripe grapes, discarding the skins. Heat the pulps with the juice and put them through a colander to remove the seeds. Add to the pulp and juice half a pound of sugar for every pound of fresh fruit used, or, better, one-half quart of sugar per quart of grape pulp and juice. Cook the mixture slowly on a steady fire for approximately an hour, or until thick and of jellylike consistency. Stir repeatedly while it is cooking. If

desired, ground pecan-nut meats, strips of citrus fruits, or a few softened grape hulls may be added to the mixture about five minutes before removing from the stove. Pack and seal the marmalade hot in sterilized jars.

#### FRUIT BUTTER

A good fruit butter can be made by following the directions for marmalade except that only one-eighth pound of sugar to a pound of fresh fruit is used.

#### MINCEMEAT SUBSTITUTE

Muscadine grape mincemeat substitute is another appetizing and distinctive product, somewhat like conserves, but cheaper, and containing fewer ingredients. No oranges are required in making this product. This is an important consideration, since oranges are expensive and often very scarce in parts of the Muscadine grape territory at the time the grapes are ripening. This preparation, as its name implies, is a substitute for ordinary mincemeat. In making pies equal parts of the mincemeat substitute and chopped apples are usually used, but the substitute is delicious without the addition of apples.

To make the mincemeat substitute, pulp the grapes, placing the pulp in one porcelain vessel and the hulls in another. Cover the hulls with water, boil violently until tender, and then run through a meat grinder, using the coarsest plate. To the pulp and juice add a teacup of water (one-half pint) for every quart of pulp and juice; boil until tender (about 15 minutes), and press through a colander to eliminate the seeds. Then mix the pulp, juice, and hulls, and to every quart of the mixture add—

The pulp of one lemon.

The ground white rind of one lemon.

Two cups (1 pint) of sugar.

One grated nutmeg.

Boil until of a thick, smooth consistency—that is, until it flakes or sheets when poured from a spoon. Seal while hot in sterilized jars.

In using this product for pies add one part of chopped apples for each part of grape mincemeat substitute, or, where fall apples are available, these can be added when making the substitute.

#### FLAVORING SIRUP

This sirup, as its name implies, is intended for use as a flavoring ingredient in the making of punch, sherbets, ices, etc. It is quite different from the heavy concentrated product previously described.

To make the flavoring sirup<sup>9</sup> add 1 quart of water to each gallon of crushed grapes and boil violently until thoroughly cooked—that is, until easily stirred and of even consistency—the berries being broken down. Then pour this liquid into a thick flannel jelly bag and let it drip into a porcelain vessel until all available juice is secured. Measure the juice and return it to the preserving kettle, adding a measure of sugar for each measure of juice. Stir until the sugar is dissolved. Let it reach the boiling point, but it must not boil or bubble. As soon as the boiling point is reached pour the sirup into sterilized bottles or jars and seal them while hot.

Two to three tablespoonfuls of this flavoring sirup added to a glass of water or to crushed ice is very refreshing.

For punch, use 1 pint of the flavoring sirup to each gallon of material.

<sup>9</sup> This recipe was furnished by Mrs. Dora Dee Walker, formerly assistant State home demonstration agent, Appleton, S. C., now food conservation specialist, Rock Hill, S. C.

## PASTES

Fruit products, such as jams, preserves, jellies, and other forms, some of which have not been used generally in this country heretofore, have been made in recent years to an increasing extent as a means of utilizing surplus fruit. Among these, none are more deserving of attention than the fruit pastes. Though comparatively little known here, the making of fruit pastes or products similar to them has been practiced for many generations, particularly in some parts of the Old World.

In many tropical countries paste is one of the chief forms in which surplus fruits are conserved for future use. A common practice in such places is to use cheese with fruit pastes, the combination serving much the same purpose as a salad course in the United States. This combination of paste with cheese, and especially with cottage cheese, is used either as a salad or a dessert.

Fruit pastes are not only wholesome and delicious but economical, because they do not require excessive quantities of sugar. Like the fruits from which they are made, they provide the body with substances needed to keep it in health, and for this and other reasons are often considered more wholesome for children than candies made chiefly of sugar. The use of fruit pastes as a substitute for candies and other confections rich in sugar has much to commend it. Further, the paste can be made with sugar substitutes, such as Muscadine grape sirup, corn sirup, homemade cane sirup, and low-grade sugar, instead of high-grade pulverized sugar.

Among the pastes none is more attractive than that made from Muscadine grapes. The use of these grapes in combination with other fruits for paste making generally results in an improved product. It is entirely practicable and advisable to use the same grapes for preparing Muscadine grape juice, jelly, and paste.

## MUSCADINE GRAPE PASTE MAKING

The process of making Muscadine grape paste is quite simple, but certain factors must be considered in order to make a desirable product. The main steps in paste making are (1) the procuring of suitable fruit, (2) the separation of the pulpy portion of the fruit from the juice, seeds, and skins, (3) the addition of the proper quantity of sweetening, (4) the cooking of the paste until it is at the right degree of stiffness or concentration, and (5) the drying of the product.

## THE VARIETY TO USE

The question of variety of Muscadine grapes for paste making is not so important as in making grape juice and jellies. Nevertheless, it is important to use the varieties which will make a paste of the desired quality. Generally speaking, those varieties which have the meatiest pulps are most desirable, since such pulps have the ideal proportion of moisture to dry matter; such varieties also yield a larger quantity of pulp from a given measure of fruit.

There is some variation in the flavor of pastes made from different varieties. Those of high sugar content, such as the Thomas, yield the best and highest flavored pastes. Varieties which owing to their pectin content are most desirable for jelly making will make a product with the most attractive appearance, because of the fact that the paste of such varieties when equally and sufficiently firm will be more nearly transparent.

The color of the finished products may be influenced greatly through the choice of varieties. For example, the James makes the darkest paste of any

of the standard varieties, a very dark brown in color. The Flowers makes a very attractive light-yellow paste of approximately the same color as apple paste. The Thomas makes a light-brown paste intermediate in shade between that of the Flowers and the James, whereas the Eden paste is a little darker than that of the Thomas. The Scuppernong variety, because of its light color and high pectin (the jelly-making substance) content, makes a light paste, resembling somewhat that of the Flowers, but having a more greenish tinge and a more jellylike consistency.

One should also consider the acidity and sweetness of the fruit and its general condition. The grapes used in paste making should be sound and fresh, fully ripe, but not overripe. The fruit of varieties of high acid content, of course, makes pastes which are sprightly as compared with the product of varieties having a low acid content. The wild Muscadine grapes for this reason make a more acid paste than most of the cultivated varieties; in fact, a slight additional quantity of sugar or sirup is advisable when their pulp is used. The pulp of sweet varieties needs less sweetening. It apparently makes little difference in the finished product whether the pulp for paste making is procured from the whole fresh fruit or as a by-product from the making of jelly or other grape products.

It is of importance to use freshly harvested fruit for paste making. Fruit that has been standing for some time, especially in large containers, may have broken and slightly fermented berries among the sound fruit. These will cause a discoloration of the pulp, for in the process of fermenting the color in the skin is set free.

#### METHODS OF OBTAINING PULP

**Pulp from fresh fruit.**—Pulp from fresh fruit is obtained by crushing the grapes and separating the pulp from the skins and juice. This can be done most effectively by using a small homemade hand crusher, such as is illustrated in Figure 1, then picking out the skins and draining off the juice. The pulps should then be heated, with sufficient stirring to prevent their sticking to the cooking vessel, until they appear white and full of air bubbles. When they have reached this stage, they will readily break on being pressed slightly between the fingers. They should then be worked through a potato ricer or colander, for the purpose of separating the pulp from the seeds. Pulp obtained in this manner may be used at once for paste making, or it may be canned in glass containers for use at any time during the winter.

**Canning the pulp.**—When canning the pulp the jars should be filled only to the neck, for the pulp expands on heating. The jars should be heated in a water bath (as recommended on page 7) until the pulp within the jars reaches the temperature of 180° F., when the jar should be sealed at once. If a thermometer is not available, allow the quart jars of pulp to remain in the bath for one hour after the boiling point is reached, the boiling to be continued during this time.

In preparing the pulp from fresh fruit in this manner, a variable quantity of water will be combined with it, depending upon how much moisture is contained in the seed cavities. Very juicy varieties will yield a moister pulp than those with less juice; the pulp of the latter is more desirable. If the pulp from juicy varieties seems entirely too moist, it should be placed in a double cheesecloth bag and squeezed by hand sufficiently to remove a part of the moisture. One of the chief causes of failure in making Muscadine grape paste is due to the fact that consideration is not given to this matter of moisture content in the pulp used. A certain proportion of moisture in the pulp is necessary, but if too much is present, a caramel rather than a paste will result. The thrifty housewife will invariably use for her paste the pulp obtained as a by-product when making other products.

If unfermented grape juice is being prepared from Muscadine grapes, it is an easy matter to procure the pulp necessary for paste making as a by-product from the grape-juice operations. After squeezing the juice from the grapes in the farm press, as recommended on page 3 there is left in the press the pomace, or "cheese," which consists of the skins, pulps, and seeds. The pulps can be readily picked from this cheese by children. By heating until it appears white and full of air bubbles and then putting it through a colander or similar utensil, the pulp is separated from the seeds. Pulp obtained in this manner will not be satisfactory unless the grapes used in the press were clean and sound.

The best means of obtaining the pulp is, perhaps, as a by-product of jelly-making.<sup>10</sup> The pulp and juice are boiled for a short time in order to dissolve the pectin from the pulp into the juice so that the latter will make jelly. The mixture of juice and pulp is then hung in a drain bag made of double cheesecloth. After the juice for jelly making has drained out, the pulp and seeds are left. Without further cooking, this mass can be put through a ricer, colander, or similar utensil in order to remove the seeds. It is then in just the right condition for paste making.

**Low-quality paste.**—A pulp of inferior quality but suitable for paste making may be procured easily by merely stewing the fruit or pomace until it is broken down thoroughly, putting it through a ricer or colander, and hanging up in a double cheesecloth bag the soft, pulpy, juicy portion that goes through the ricer, so that the excess moisture will drain off.

If a fruit, wine, and jelly press is available, pulp for paste may be procured quickly by grinding the fruit through this machine and hanging the pulp and juice which is delivered, separate from the skins and seeds, in a double cheesecloth bag, to allow the excess juice to drain off.

Pulp obtained by stewing the fruit or by use of the fruit, wine, and jelly press will make paste that is more or less reddish, depending on the amount of color in the skins of the grapes used. Such paste is not transparent. It is of value, however, from the standpoint of providing variety in the product.

**High-quality paste.**—If it is desired to make paste of high quality, in addition merely to separating the seeds from the pulp it is best to work the pulp through a purée strainer in order to remove the coarser portions, the “brushes,” which are the bundles of fibers connecting the seeds in the berry with the stem of the grape clusters. With most bunch grapes and some of the Muscadines, these bundles remain with the stem when the grape is pulled from its point of attachment, but in nearly all Muscadine varieties the brush remains with the berry rather than with the stem when they are separated.

If the grape pulp is to be used with other fruit pulps in paste making, the combination should be made before proceeding further.

#### SWEETENING

The best kind of sweetening to use in making Muscadine grape and other pastes is powdered, pulverized, or confectioners' sugar. This gives a product with the smoothest finish and is preferable to liquid sweeteners, such as sirups, owing to the fact that less cooking is required in order to drive off the moisture and that the paste is, accordingly, lighter in color and more attractive in appearance.

However, other sweeteners can be used satisfactorily. Perhaps the best of these is Muscadine grape sirup, made in accordance with the directions given on page 3. Commercial corn sirup, especially the light-colored type, may be used successfully. Grade C sugar may be used also. If the housewife has homemade sugar from cane sirup, it may be used for paste making, though it is not so good as grade C sugar, since it has more flavor of its own. Ordinary granulated sugar is not recommended, though it can be used. Ribbon-cane sirup has not enough welding power to be satisfactory.

If a solid sweetener, such as powdered sugar, is used, the best proportion for Muscadine grape paste making, when economy and quality of the finished product are considered, is one-half pound of sugar for each pound (or pint) of pulp. If the pulp is drier than the average, it is desirable to use a slightly increased quantity of sugar. Less sugar in proportion to the pulp is required than would be called for in making paste of such a fruit as the apple, which needs more sugar than the grape in order to produce a pasty consistency rather than an apple sauce. If economy in sugar is not a factor and the product is not to be stored, a better flavored paste can be made by using three-quarters to a pound of sugar with each pound of grape pulp. Such pastes, however, are generally too soft to keep well when stored. When using a liquid sweetener in paste making, a pint of sirup may be considered equivalent to a pound of powdered sugar. It is preferable, however, to use it in the proportion of 1 cup of sirup to 2 cups of grape pulp. A darker product results when liquid sweeteners are used, owing to the longer cooking period required.

<sup>10</sup> The making of jelly from the pulp and juice of the grape after discarding the skins has been shown by the writer of this bulletin to be desirable as an easy and sure means of avoiding argol crystal formation (irregularly shaped acid crystals) in Muscadine grape jelly.



## COOKING

In cooking the paste, generally speaking, the same principles are involved as in jelly making. It is better to use milk pans of such size that the paste can be spread out in a thin layer rather than to cook it in a deep vessel like a saucepan or preserving kettle. By using milk pans the moisture is driven off with the greatest possible speed and this tends to make a bright, attractive product. The necessity for a broad-bottomed vessel is greater where a liquid sweetener is used.

Although it is important to drive off the moisture as rapidly as possible, there is, on the other hand, a limit to the speed at which the paste can be cooked. If boiled too rapidly, it sputters and pops out of the vessel and may burn seriously the one who is attending to the cooking. To prevent this it is necessary, especially when the paste reaches the finishing point, to cook it over an asbestos plate or mat. This mat is not so important on an ordinary kitchen range as it is for a gas or oil stove, for on a range burning coal or wood the paste can be drawn back from the hottest part of the stove. Although the paste does not require rapid stirring, it needs almost constant attention, especially as it nears the finishing point. It should be stirred systematically to prevent its burning, and for this purpose a wooden paddle having a square edge is decidedly better than a spoon. The paste should be cooked until it is so stiff that when the paddle is drawn through it the mass will not readily flow together again. Another way to describe the finishing point would be to say that the paste should be cooked until it forms a rather definite mass which can be shoved from place to place about the cooking vessel with the paddle instead of flowing. When it has reached this stage, it should be poured out promptly.

## DRYING, CUTTING, AND STORING

Owing to the stiffness of the paste it is important that it be poured out rapidly, and that as soon as it is emptied from the cooking vessel it be placed in a mold or spread into a sheet one-half inch in thickness on a marble, enamel, or china surface. Large meat platters, enameled biscuit pans, the bottoms of enameled dish pans if clean, or a marble-topped table are satisfactory surfaces on which to spread it. These should be oiled or greased and ready to receive the paste when it is done. The best grade of oils, those having the least flavor, are most suitable, though for home use lower grade oils, butter, or even a good grade of lard may be used. After being poured out and spread in a layer approximately half an inch in thickness, the paste should be put in an airy but shaded place, such as an open, shaded window, in order that it may dry as rapidly as possible. If it is set in a sunny window there may be sufficient heat to keep the paste soft. While drying, it should be protected from flies by cheesecloth or netting. It should stand at least 12 hours before it is cut.

**Cutting the paste.**—After having become reasonably dry, the paste may be cut into small pieces. Portions 1 inch square make a convenient size; it is desirable, however, to cut it in various attractive shapes. The individual pieces of paste should then be rolled in granulated sugar and spread out to dry further. It is well to place them at this time with the side up that was next to the surface on which the paste was originally spread. If necessary in order to get the paste thoroughly dry, it may be left for several days, the pieces being turned occasionally.

**Drying the paste.**—At times, in the southeastern part of the United States where Muscadine grapes are grown, there is so much moisture in the air that the paste, instead of drying, will actually take moisture from the air. Such periods can usually be avoided, and for home use it is possible to avoid this by canning the pulp and making the paste fresh whenever it is desired and the weather is favorable. This method has another advantage in that sugar is more abundant and cheaper at some seasons than at others. Again, the difficulty in drying paste owing to weather conditions may be overcome by dipping the pieces of paste in a candy coating without waiting for thorough drying. The use of heat for drying is not practicable, as heat softens the paste. The use of an electric fan under the weather conditions described will merely increase the trouble unless provision is first made for drying and cooling the air to be blown over the paste. It is useless to store paste that is not thoroughly dry; but after it is properly dried it may be kept indefinitely in boxes or other

suitable containers. The box in which the paste is to be packed should be lined with oiled paper, and a sheet of this paper should be placed between every two layers of the paste. If the paste is to be kept over a long period it should be put in the driest possible place and the box sealed to keep out moisture.

#### VARIATIONS IN PRODUCT

The foregoing directions are applicable for making a plain Muscadine grape paste. They may be varied more or less for the purpose of having variety in the products. For example, if paste is made from several varieties of grapes, and pieces of these pastes are served together from the same dish, pleasing color differences will be obtained. The variation in color may be still further increased by serving the grape paste with other fruit pastes.

Coloring the paste.—Still further variety may be obtained by using harmless vegetable coloring, which may be added to a small portion of the paste when it is about two-thirds cooked. While the rest of the paste is coming to the finishing point this part should be worked thoroughly with a spoon, in order to get the coloring matter uniformly mixed with it. Near the end of the cooking process the colored portion should be added to that in the cooking vessel and worked in uniformly by stirring.

Fruit or nut additions.—Just before removing the paste from the stove various mixtures of nuts and raisins may be stirred into it for the purpose of procuring variety in the product. With the same object in view, it is desirable at times to place the kernels of nuts or such fruits as candied cherries or raisins on the paste immediately after it is poured out, pushing these garnishings into the mass sufficiently to make them hold firmly as it cools. After cooling, the paste is cut around the garnishing so that each piece has in its center a nut kernel or fruit meat. This makes very attractive paste.

Cutting different shapes.—It adds greatly to the appearance of a dish of finished paste if the pieces are cut into various shapes. It is easy to cut the paste into squares, triangles, diamonds, circles, stars, rings, moons, and various other forms.

Making a paste loaf.—Another good method of preparation is to spread on the cooled paste a mixture of ground nuts and raisins or melted marshmallow, or a combination of the two, and then roll the paste into a loaf, cutting it as one would cut a jelly roll. In cutting this candy loaf it is advisable to use a sharp butcher knife, which should be heated and oiled frequently in order that the cleavages may be smoothly and easily made.

Marshmallow layer paste.—It is also possible to spread paste of one color upon that of another and to cut through the double layer so that each piece will show paste of two colors. It is even more attractive to place between these layers of paste a layer of marshmallow whip or melted marshmallow, since the color of the paste is set off better by the white of the marshmallow layer than when the layers of paste are next to each other. For the white layer it is desirable to use the best grade of marshmallows. These should be melted in a double boiler or cereal cooker. It is best to arrange the work so that the paste can be cut in the desired form immediately after placing the marshmallow between the layers, for at times the marshmallow, when it cools, hardens to such an extent that it is difficult to cut it without causing it to pull out in shreds from between the layers. This trouble is especially likely to occur if a poor grade of marshmallows is used.

Paste for sandwiches.—If the paste is cooked only two-thirds of the normal time and is then sealed hot in sterilized jars, it is excellent for use as a filling for sandwiches.

Pulled paste.—If, in making paste, one has used fruit pulp that is entirely too moist, the resulting product, as previously stated, will be a caramel rather than a paste. Should it be noticed that this mistake has been made, the product can be poured out before it has begun to harden, and it can then be pulled, like molasses candy. This makes a very good product and will prevent waste.

Paste in molds.—Again, the paste may be worked into a large solid mold instead of being cut into small pieces. In these molds paste of another color, or even jelly, may be embedded. A butter mold or some homemade form may be used, or even a candy box with top and bottom discarded. A mold measuring 2 by 6 inches is a desirable size; if preferred, these molds may be made of such a size that two of them will pack snugly in a 2-pound candy box. Each mold should be wrapped in oiled paper after drying and before being put into the boxes. The boxes should be sealed by pasting a tape around them where

the lid and bottom meet and then stored in a cool, dry place. The mold form is preferable for serving with cheese.

**Candy-coated paste.**—This is most attractive and delicious and enables one to obtain still greater variations in the product. This coating may be plain or flavored with chocolate, extracts, etc. The addition of chocolate or cocoa will make a brown product, and by the use of harmless vegetable coloring in the candy coating many other attractive colors may be obtained. A plain candy coating will be white, and if used sparingly on pieces of paste the garnishing will show through the coating in a way to tempt the most fastidious appetite.

Commercial candy makers have their own methods of candy coating. The following brief directions are intended for use in the home: A delicious plain candy coating is made by using 2 cups of granulated sugar and 1 cup of cream. Mix and heat thoroughly. Boil until it reaches 230° F. or until a small amount poured on a saucer and stirred with a fork will candy on the fork. Remove from the fire and cool to 110° F. and beat thoroughly; pour into a cereal cooker having boiling water in the lower chamber, so that the candy will not harden. Then dip the pieces of paste into the candy. Thoroughly coat each piece of paste and then place it on an oiled china, porcelain, or marble surface, making sure that the pieces are completely but not excessively coated. After allowing the candy coating to harden, the paste is ready for packing or serving.

In making the plain coating, water or milk may be used in lieu of cream, but it is not so good. The use of a level tablespoonful of butter with the milk is about equivalent to using cream. If cocoa or grated chocolate are to be used, add these to the sugar before adding the liquid. Use one-tenth pound of cocoa or one-fourth pound of cake chocolate for every 2 cups of sugar. If desired, vanilla or some other extract may be added just as the candy is taken from the fire. Use 3 to 6 drops of extract, depending on its strength, for each 2 cups of sugar used. Artificial coloring should be added as the candy is taken from the fire, after having first dissolved the coloring material in a small quantity of the candy at cooking temperature. The candy should be stirred as little as possible, never except to prevent burning. If more appropriate utensils are not at hand, forceps suitable for dipping the paste can be easily made by bending a piece of sterilized stiff wire into a loop so that the points meet each other. Such a piece of wire, with a teaspoon to remove excess coating, is satisfactory. A two-pronged fork if available is better than the wire.

Ground coconut is admirably adapted for addition to the candy coating, to use in place of a candy coating, or for stirring into the paste itself when it is being made.

#### OTHER FRUIT PASTES

Owing to the fact that Muscadine grape paste has a certain sprightliness which such a paste as that made from the apple lacks, it is very desirable for blending with other fruits. Generally, the blended pastes are the best. Muscadine grape pulp blends excellently with pulp of the apple, pear, guava, or persimmons. Pastes made from other fruits usually are prepared in the same way as Muscadine grape paste.

Guava paste is one of the best of the fruit pastes. In making it, one should take the precaution to cut the paste very soon after it is poured out, as it hardens much more rapidly than grape paste.

Although the apple makes a product which has less character than Muscadine grape paste, its consistency is excellent and it keeps well in storage. The quantity of sugar necessary for making apple paste is greater than that required when Muscadine grapes are used. Three-quarters of a pound to a pound of powdered sugar for each pound of apple pulp is necessary. The apple pulp may be obtained either by preparing a cooked apple sauce or by grinding the white meat of the apple to a pulp and then working it through a purée strainer. The former method is better. The apples for the sauce

should be peeled and only the white meaty portion used. This should be cut in small slices or lumps, and if the apples are of average size and juiciness, a pint of water should be added to each dozen apples in preparing the sauce in a saucepan. If a milk pan is used in making the apple sauce, there will perhaps be more evaporation, and for this reason it would be better to use  $1\frac{1}{2}$  pints of water for each dozen apples, or to add some water while the apples are stewing if this becomes necessary. In the case of such fruits as the peach, pear, and plum, pulp for paste making can be obtained by preparing a sauce in the same way as for apples. The natural juiciness of the fruit must always be considered in order to determine the quantity of water to use. Pulp from berries, such as strawberries, raspberries, and blackberries, can be obtained in the same manner as that from the grape except that care should be taken to put the pulp through a purée strainer in order to get rid of the small seeds.

Although Muscadine grape paste is perhaps more likely to absorb moisture than it is to become so hard and dry as to be difficult to use, paste made of some kinds of fruit sometimes gets so dry that it is exceedingly hard and leathery, and in this condition it cuts with difficulty and is not easy to use. When in this condition it may be improved by the following procedure:<sup>11</sup>

Cut into cubes and arrange them in a layer in the bottom of a shallow pan and then add a very little water—no more than they will take up. This will soften the cubes. If not soft enough the first time, the procedure can be repeated. The cubes should be soft enough to pierce with a fork and about like a stiff jelly in consistency. They may be served in a fruit salad, or as a garnish, or used in place of jelly. Or, if preferred, they may be coated with candy.

### SUMMARY

Desirable culinary products can be easily and cheaply prepared in the home from surplus home-grown Muscadine grapes.

Such products may be used as a substitute for or to supplement products requiring a cash outlay.

Only simple home utensils are needed in the preparation of these products.

The utilization of fruit heretofore unused will not only prevent waste in the home, but indirectly aid the commercial industry.

The Thomas and the Scuppernong are the best of the standard commercial varieties for culinary purposes.

Jellies, grape juices, sirups, canned grapes, catsups, and conserves are the most desirable products made from Muscadine grapes.

Of the products made from the whole fruit, those requiring a large proportion of sugar are not equal in quality to those in which small proportions of sugar are used.

Muscadine grape sirup is made without the addition of sugar. It is not only a good sirup, but useful as a sugar substitute in preparing other culinary products.

Muscadine grape juice is the cheapest product and the most easily made of all those mentioned in this bulletin. This juice is a pleasant and refreshing summer drink. The Thomas is the best variety for making grape juice, and the Scuppernong ranks second of all

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<sup>11</sup> Directions supplied by the Bureau of Home Economics.

the varieties tried. The cold-press method described is the best and cheapest for preparing this grape juice.

Muscadine grape jelly ranks high as a culinary product. In making it the two essentials are to avoid crystal formation in the jelly and to provide enough pectin to make jelly with sufficient body. The chief factors to be considered are the ripeness of the fruit, the variety, the quantity of sugar used, the general procedure, and the proper use of pectin solution.

Canned Muscadine grapes and spiced Muscadine grapes are desirable products and are relatively cheap. The chief essentials in canning are the removal of seeds, the softening of skins, and the thorough sterilization of fruit and containers.

Muscadine grape catsup is an excellent sauce for serving with cold meats. It is a product easily prepared and relatively cheap.

Muscadine grape conserves are very delicious and wholesome, consisting of raisins, oranges, and nuts combined with grapes. They are especially recommended for school lunches in the South.

Muscadine grape paste is an economical, appetizing, and nutritious substitute for candy and other confections. It is excellent when combined with cheese, especially cottage cheese, as a substitute for a salad course or for dessert. It is particularly desirable for home use, but where grapes are plentiful it has commercial possibilities.